REMARKS

Summary of Action

In the subject office action, the Office Action:

(a) Objects to FIG. 2 as not showing cross hatching fir the elongated shaft and composite wrapping.

(b) Objects to the drawings because they do not show every feature of the invention specified in the claims.

(c) Objects to the title as not being descriptive.

(d) Rejects claims 26 and 41 as being duplicative of other claims

(e) Rejects Claims 60, 65 and 66 for using words that lack a clear antecedent basis.

(f) claims 12,22,26 and 27 under 35 USC 102 as being anticipated by Kobatake et al (US 4,786,341);

(g) claims 1012, 14-16, 22-25, 29-42, 44-56, 58-63, and 66-67 under 35 USC 103 as being unpatentable over Kobatake et al in view of Owens et al (US 5,175,973); and

(h) claims 13, 28, 43, 57, 64, and 68 under 35 USC 103 as being unpatentable over Kobatake et al as modified by Owens et al, and further in view of Williams et al (US 5,516,236).

Summary of Response

The office action objected to the drawings because the cross hatching for the elongated shaft and composite wrapping in Fig. 2 is not shown. Submitted for the Examiner's approval is a revised Fig. 2 with the necessary cross-hatching.

In the Office Action, the Examiner also objected to the drawings because they did not show every feature of the invention specified in the claims, namely "an impregnator" in claim 2, line 3 and claim 47, line 3, a "resin bath, rollers and doctor blades" in claim 3, line 2, a "carriage" in claim 4, line 2 and claim 49, line 2, and a "filament winding apparatus" in claim 16, line 4. Submitted for the Examiner's approval are Fig.'s 3 and 4 showing the necessary items specified in the claims. Since the items shown in FIGs. 3 and 4 are identified and discussed in the specification, no new matter has been added.

In response to the 112 rejections, duplicative claims 26 and 41 have been deleted. Claims 60, 65 and 66 have been amended to correct the antecedent basis confusion.

In response to the 102(b) rejections, Applicant respectfully traverses the Office Action rejection. Kobatake does not teach each and every element of the claims, including but not limited to the composite wrapping applying a radial compressive force upon the elongate shaft.

In response to the 103(a) rejections, Applicants respectively traverse the Office Action rejection.

All amendments are fully supported by the original disclosures. No new matter has been introduced.

Rejection of claims 17, 22, 27 under 35 USC 102(b)

Claim 17:

The Office Action asserted that Kobatake anticipates Claim 17 because it discloses each element of the claim. Applicant respectfully disagrees. Claim 17 recites:

17. A reinforced support piling comprising:

a non-hollow elongate shaft having a length and an exterior surface extending along said length; and

a composite wrapping, said composite wrapping encircling said exterior surface along at least a portion of said length, said composite wrapping ***forming a layer of substantially uniform thickness*** and materials;

wherein ***said composite wrapping applies a radial compressive force*** upon said elongate shaft.

The Office Action asserts that Kobatake discloses, among other things, a composite wrapping that applies a radial compressive force upon the elongate shaft, citing Figs. 1-7 and col. 5, lines 10-45. Anticipation, however, requires that the disclosure in a single prior art reference of each element of the claim under consideration. *In re Dillon,* 919 F.2d 688 (Fed. Cir. 1990) (en banc), *cert denied* 500 U.S. 904 (1991). Applicant cannot find any reference to or teaching of applying a radial compressive force on the elongated shaft in Kobatake, and therefore requests that the rejection be reconsidered.

It is worthy to note that Kobatake actually teaches the opposite of applying a radial compressive force. For example in col. 5, lines 45-60, Kobatake teaches using an insulating material in a "non-adhesive manner" between the concrete structure and the reinforcing fibers. Kobatake states that "[t]here is no particular restriction as to the insulating member, ***provided that it may produce sliding*** between the concrete structural member and the insulating member, or between the insulating member and the reinforcing member, or both, when it is interposed between the concrete structural member and the reinforcing member." Sliding

would likely not occur if a radial compressive force was applied on the concrete column of Kobatake.

Kobatake also does not disclose or teach the composite wrapping to form a layer of ***substantially uniform thickness***. Kobatake simply describes winding a single fiber in "a double spiral fashion," but makes no mention of keeping the winding to a substantially uniform thickness. Depending on the thickness of the fiber winding, where the fiber windings intersect (8 in Fig. 2), the portion of the wrapping would be a substantially different thickness than that of the portions between the windings. Further, Kobatake teaches pressing the fiber to increase the breadth. col. 5, lines 33-35. Kobatake does not, however teach or even allude to keeping the reinforcing member to a substantially uniform thickness.

Accordingly, for at least the above reasons, claim 17 is patentable over Kobatake, and applicant respectfully requests the Examiner so find.

Claims 22, 26 and 27:

Claim 26 was cancelled. Claims 22 and 27 depend on claim 17, incorporating its limitations. Therefore, for at least the same reasons, claims 22 and 27 are patentable over Kobatake.

Claims 18-21 and 23-25:

Claims 18-21 and 23-25 also depend on claim 17, incorporating its limitations. Therefore, for at least the same reasons discussed above, and for the reasons discussed below in regard to the 103(a) rejection, claim 18-21 and 23-25 are patentable over Kobatake and Owens.

Rejection of claims 1-12, 14-16, 18-21, 23-25, 29-42, 44-56, 58-63 and 66-67 Under 35 USC 103(a)

Claims 1, 16, 29, 44, 60, and 61:

The Office action states it would have been obvious to "replace the concrete piling of Kobatake et al with the wood pole/piling [of Owens] in order to provide the variety of use for the fiber blanket or wrapping for the reinforcement and repair of the support piling/pole." Applicant respectfully disagrees with the Office Action rejection and therefore traverses the rejection for the following reasons. First, Kobatake and Owens do not teach each and every element required in the claims. Second, there is no suggestion in either reference to combine the wood pole of Owens with the concrete structure of Kobatake. Owens actually teaches away from combining the references. For these reasons, applicant submits that the Office Action impermissibly uses hind sight based on Applicant's disclosure to support its rejection.

The Federal Circuit has repeatedly cautioned against employing hindsight by using the applicant's disclosure as a blueprint to reconstruct the claimed invention out of isolated teachings of the prior art. *See, e.g., Grain Processing Corp. v. American-Maize Prods. Co.*, 840 F.2d 902, 5 U.S.P.Q.2d 1788, 1792 (Fed. Cir. 1988). Applicant submits that this is a case where a reference must have some clear and specific suggestion or indication of the presence of the feature claimed, yet the disclosed references lacks such specificity. It is understandable that it is attractive to initially choose to isolate certain elements in a patent claim and opine, with the benefit of hindsight, that the element or elements are present in the prior art. However, in the absence of a specific suggestion, such a practice is tantamount to impermissibly using Applicant's teachings to hunt through the prior art references for the claimed elements and concoct them in combination without suggestion. *In re*

Laskowski, 871 F.2d 115, 10 U.S.P.Q.2d 1397, 1398 (Fed. Cir. 1989). Specific, concrete documentation of the feature in the prior art, or some suggestion thereof must be provided. *Id.*

1. *There is no suggestion or motivation in Kobatake or Owens to combine the references, especially since both Owens and Kobatake teach away from combining the references.*

In addition to the discussion of Kobatake above, Kobatake is directed to reinforcing ***concrete*** structures to improve their aseismatic performance. Kobatake is principally concerned with increasing the shear strength of a concrete support structure so that it can better withstand seismic activities during earthquakes. To do so, Kobatake teaches winding a ***single*** reinforced fiber that is impregnated with a resin around the concrete structure. The reinforcing fiber of Kobatake is acting to prevent cracks that develop in the concrete column from spreading, and resisting failure of the concrete structures due to shear stresses imposed during seismic activity. Kobatake does not teach or even suggest using ***multiple fibers*** that are impregnated with resin to wrap a section of a ***wood*** pole/piling to solve the variety of problems associated with using wood poles that do not arise in concrete structures.

The problems being solved in the present invention include preventing decomposition and infestation of wood support pilings, especially at points where the wood is in contact with the ground or wet surfaces, such as in a utility pole and marine applications. Though Kobatake mentions moisture problems with the prior art Metal wrapping of concrete structures, it is not concerned with preventing decomposition or infestation of concrete structures.

The present invention can also increase the ***stiffness*** of the wood pole through the use of the composite wrapping. Unlike Kobatake, which is primarily

concerned with resisting sheering forces applied to the concrete structures, the composite wrapping of wood poles increases the stiffness, which can increases the tensile strength of the wood poles such that they better resist bending and ultimate failure. Increasing the stiffness in such a manner has the benefit of enabling the use of lower class wood poles for applications that require a higher rated pole. Something not taught or disclosed by Kobatake. Further, because wood poles have a natural tendency to split as it ages and acclimates, the present invention extracts the benefit from this phenomenon of further increasing the stiffness of the pole because of the composite wrapping. Increasing the stiffness also increases the durability of the wood piling to resist peeling during driving the piling into the ground. Again Kobatake fails to teach and is not concerned with stiffening the concrete structures to solve the problems encountered by wood poles.

Kobatake is also directed to the in situ winding the reinforced fiber onto the concrete support structures while they are in place, either as preexisting (old) structures, or newly constructed concrete structures that have been erected. Consequently, Kobatake teaches away from the reinforcement of wood poles ***prior to*** installation and use. This is evidenced by Kobatake consistent reference to the areas at the top and bottom of the column-- where the structure joins the floor or the ceiling—as the primary stress points, and as the weak points. The Kobatake claims are also expressly limited to "existing elongate concrete structural member[s]." col. 12, line 1. Unlike Kobatake, the present invention is directed to composite wrapping poles ex situ, typically prior to being placed in operation, or possibly poles that are removed, reinforced and then replaced.

The Office Action expressly acknowledges Kobatake does not disclose or suggest "the support piling as at least 10 feet long-wood piling/pole buried in the ground and having a moisture content and a multiple-tow bundle of fibers/strands."

The Office Action relies on Owens as teaching the reinforcement of ***wood*** poles by wrapping a portion of the pole with a fiberglass blanket/mat; using wood poles having a moisture content of 19%; and the wrapped portion having a plurality /multiple-tow bundle of strands.

Owens, however, is exclusively directed to repairing wood poles "in situ" (col. 4, line 16). Owens, like Kobatake, therefore teaches away from composite wrapping of wood poles/pilings prior to being placed into operation. Owens teaches an elaborate in situ repair method that involves cutting away the decayed or damaged portion of a wood pole, filling the cut away portion with a compressive filler material, wrapping the filled portion with a fiberglass blanket, applying a resin and finally an ultraviolet inhibiting coating. Owens specifically teaches applying the composite wrapping in strips by hand, as opposed to winding a plurality of strands/fibers to the column while on a filament winding apparatus, as the present invention provides.

Despite being directed to solving different problems, there is simply no suggestion or motivation in either Kobatake or Owens to combine the references. Further, Owens and Kobatake teach away from combining the references. Accordingly, claims 1, 16, 29, 44, 60 and 61 should be allowed. Since claims 2-15 depend on claim 1, claim 68 depends on claim 16, claims 30-43 depend on claim 29, claims 45-59 depend on claim 44, and 62-67 depend on claim 61, and incorporate the respective limitations, for at least the same reasons, these claims are patentable over Kobatake and Owens.

2. *Kobatake and Owens fail to teach every element of the claimed invention.*

Claims 1 -15.

Despite no suggestion or motivation to combine Owens and Kobatake, and because both deal with in situ repair, neither reverence teaches applying ***a plurality***

of resin impregnated fiber by "***rotating said support piling***" to form a composite wrapping. As discussed above, Kobatake and Owens pertain to repairing/strengthening structures that are in place, which makes rotating the structure to apply the composite wrapping—whether it be concrete or wood—virtually impossible. In fact, Owens explicitly requires application of fiberglass mat strips by hand while in place. As discussed more fully above, a reference must have some clear and specific suggestion or indication of the presence of the feature claimed, yet the disclosed references lack such specificity. For these reasons and the reasons discussed above, Kobatake and Owen fail to teach every element of claim 1.

Claims 2-15 depend on claim 1, incorporating its limitations. Accordingly, for at least the same reasons, these claims are patentable over Kobatake and Owens.

Claims 16, 68

Kobatake and Owen do not teach "placing said wood support piling on a filament winding apparatus." As discussed above, Kobatake and Owen actually teach away from ex situ application of a plurality of composite fibers using a filament winding apparatus. For these reasons and the reasons discussed above, Kobatake and Owen fail to make teach every element of claim 16.

Claim 68 depends on claim 16, incorporating its limitations. Accordingly, for at least the same reasons, this claim is patentable over Kobatake and Owens.

Claims 29-43

Kobatake and Owens do not teach increasing the stiffness of the pole or piling ***at least 20 percent***. The Office Action simply states, without explanation or justification that "with respect to the variety of ranges of the stiffness...it would have

been obvious to one skilled in the art at the time the invention was made to provide such a range...." Accordingly, Applicant believes that the Office Action's dismissal of these limitations as simply obvious to one skilled in the art, without more, impermissibly uses the application as a guide.

Indeed, it would take a retrospective view of Kobatake and Owen, in light of applicant's discovery as defined in claim 29, to enable one of ordinary skill to obtain the concept of increasing the stiffness at least 20 percent, and solve the problems and take advantage of the benefit of using inferior or lower class poles in operations where a higher class/stiffer pole is required. Again, such use of Applicants disclosure is impermissible. *In re Newell*, 891 F.2d 899, 13 U.S.P.Q.2d 1248, 1250 (Fed. Cir. 1989). The law cited above, and other similar authority, prohibit such use and hindsight speculation to be relied upon for a finding of unpatentability. Therefore, claim 29 is not anticipated or rendered obvious by Kobatake and Owens, and is believed to be allowable.

Claims 30-43 depend on claim 29, incorporating its limitations. Accordingly, for at least the same reasons, these claims are patentable over Kobatake and Owens.

Claims 44-59

As discussed above, Kobatake does not teach applying "***a multiple tow bundle of fibers***" to a ***wood*** pole. Likewise, Owens does not teach winding a tow bundle of fibers about the wood pole, but rather discloses only the use of strips of fiber mat. Further, as discussed above, neither Kobatake or Owens teach "maintaining said fibers **under tension**." Kobatake and Owens actually teach away from applying under tension. For example, in one embodiment Kobatake teaches inserting a sleeve between the concrete structure and the fiber winding such that it

produces sliding. Kobatake does mention that tension can be applied at certain portions of the windings, but only in the context of preventing slackening of the windings (consequently, this also confirms that Kobatake teaches situ application of fibers). Owens discloses manual hand application of the fiberglass mat, and does not suggest application of maintaining any sort of tension on the fibers. Because Kobatake and Owens do not teach application of multiple fibers by maintaining the fibers under tension, and actually teaches away from such an application, Applicant believes that claim 44 is allowable over the referenced prior art.

Claims 45-59 depend on claim 44, incorporating its limitations. Accordingly, for at least the same reasons, these claims are patentable over Kobatake and Owens.

Claim 60

Kobatake and Owens do not teach every element of claim 60. As discussed at length above, neither teach or suggest rotating the wood support piling, placing the wood piling on a filament winding apparatus, applying tension to the multiple fibers during winding, having the fibers apply a radial compression to the wood piling, increasing the stiffness, and creating layer of substantially uniform thickness. Accordingly, applicant believes that claim 60 is patentable over Kobatake and Owens.

Claims 61-67

Claim 61 provides a method for reinforcing a wood pole with a composite wrapping, which includes selecting a wood pole having a moisture content less than 25%. The Office Action acknowledges that Kobatake does not teach such a step, but relies on Owens as providing the teaching. Applicant acknowledges that Owens

does happen to mention 19% moisture content as being the "best conditions." This statement, however, is identified in relation to repair of wood pilings in marine applications to enable calculation of the stress to which a repaired piling must meet. Because Owens is directed to repair of existing pilings, thus rendering pole selection not an option, it does not teach or suggest the selection of such a pole having any particular moisture content.

Claim 61, includes selecting of a pole with a less than 25% moisture content. As discussed in the application, selecting a wood pole having a moisture content below 25% may improve the strength of a wood pole because the pole may experience some splitting as it dries, which in turn has a positive impact on the stiffness of the pole. A benefit not taught or suggested by Owen. Therefore, Applicant believes that claim 61 is patentable over the referenced prior art of Kobatake and Owens.

Claims 62-67 depend on claim 61, incorporating its limitations. Accordingly, for at least the same reasons, these claims are patentable over Kobatake and Owens.

Rejection of claims 13, 28, 43, 57, 64 and 68 Under 35 USC 103(a)

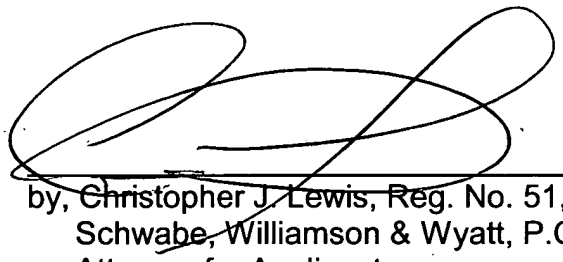
The Office Action rejects claims 13, 28, 43, 57, 64 and 68 as being obvious in further view of Williams, asserting that Williams teaches composite wrapping bonded to the wood piling by nails as a mechanical bond. Applicant believes that because these claims incorporate the limitations of their respective independent claims discussed above, they are allowable over the referenced prior art.

Conclusion

In view of the foregoing, Applicants respectfully submit that claims 1-25, 27-40, 42-68 are all in condition for allowance, and early issuance of the Notice of Allowance is respectfully requested.

Please charge any shortages and credit any overages to Deposit Account No. 500393.

Respectfully submitted,



Date: June 16, 2003

by, Christopher J. Lewis, Reg. No. 51,246
Schwabe, Williamson & Wyatt, P.C.
Attorney for Applicants

Pacwest Center
1211 SW Fifth Ave., Ste 1600-1900
Portland, Oregon 97204
Phone: (503) 222-9981,
FAX: (503) 796-2900

MARKED VERSION OF AMENDMENTS TO SHOW CHANGES MADE

In The Specification

Page 1: Title – please amend the title as follows:

WOOD SUPPORT PILING WITH COMPOSITE WRAPPING AND METHOD FOR REINFORCING THE SAME

Page 7: Brief Description of the Drawings - please insert the following:

FIG. 3 is a top view of a filament winding apparatus and impregnator in accordance with one embodiment of the present invention; and

FIG. 4 is a side cross-sectional view of a filament winding apparatus and impregnator in accordance with one embodiment of the present invention.

Pages 9-11 : Detailed Description of the Preferred Embodiments

The reinforced wood support piling 20 is manufactured by a filament winding process as shown in FIGs. 3 and 4. This allows the reinforced wood support piling 20 to be mass-produced economically, and allows substantial control over the manufacturing to improve quality. Thus, this method provides advantages over methods that attempt to repair deteriorated poles while they are in place in the ground. Filament winding is a reinforced plastic process employing a series of continuous, resin-impregnated fibers 42 or strands applied to the rotating elongate shaft 30. The strands 42 may be impregnated with the resin by passing through an impregnator 43, which may consist of a resin bath 44 having rollers 45 and doctor blades 46, to saturate the strands 42 with the resin. The resin-impregnated fibers 42 may be installed in a predetermined geometrical pattern under controlled tension, which then cures to form the composite wrapping 40 with a high strength-to-weight ratio, good corrosion resistance, thermal and impact resistance, and a high strength-to-thickness ratio. The filaments 42 are

preferably composed of fiberglass, however, other materials known to those skilled in the art may be used within the scope of the present invention. Suitable resins include epoxies, polyesters, polyimides, silicones, polyethylenes, and phenolics or any other such resin known to those skilled in the art. The particular resin used may be selected to be suitable for the intended purpose based on various factors such as cost, strength, durability, fire retardation characteristics, or appearance, for example.

Equipment for the filament winding process may resemble the conventional machine shop lathe 50. The elongate shaft 30 may be positioned between the headstock 51 and tailstock 52 and rotated so that tow threads or fibers 42, after being saturated with plastic binding material, may be pulled onto the exterior surface 32 of the shaft 30. A carriage 47~~(not shown)~~ dispenses the reinforcement fibers 42 and moves in a direction parallel to the longitudinal axis 48 of the elongate shaft 30. The linear speed of the carriage may be synchronized with the rotational speed of the elongate shaft 30 so that the reinforcement fibers 42 are applied at some predetermined and controlled position and orientation. Preferably, the tow threads or fibers 42 are applied to the wood pole 30 to form windings which form an angle θ as shown in FIG. 1 with respect to the longitudinal axis 48 of the shaft 30 within a range of sixty to ninety degrees (60°-90°). Most preferably, the angle of the windings is approximately eighty degrees (80°). The carriage 47 traverses back and forth for the length of travel required to produce the desired length of the composite wrapping 40, which would extend along part or all of the shaft 30. The number of passes of carriage travel and rotations of the elongate shaft 30 cooperate to establish the amount of composite material deposited onto the elongate shaft 30, and thereby the thickness of the composite wrapping 40.

In The Claims

Please amend the claims as follows:

60. (Currently Amended) A method for reinforcing a wood support piling with a composite wrapping, said method comprising:

(A) selecting said wood support piling having a moisture content within a range of 15 to 20 percent;

(B) placing said wood support piling on a filament winding apparatus;

(C) applying a resin to a multiple-tow bundle of fibers by passing said multiple-tow bundle of fibers through an impregnator, said impregnator comprising a resin bath, rollers, and doctor blades;

(D) rotating said wood support piling;

(E) winding said multiple-tow bundle of fibers about said wood support piling and applying tension to said ~~plurality of strands~~ multiple-tow bundle of fibers during said winding such that said tension becomes applies to said wood support piling, and maintaining said fibers under tension within a range of 30-120 pounds, said multiple-tow bundle of fibers being wound about said wood support piling at an angle within a range of 60-90 degrees with respect to a longitudinal axis of the wood support piling;

(F) undertaking parts (C) to (E) above in a manner sufficient to form said composite wrapping of a filament-wound fiber-reinforced bonding agent;

(G) allowing said resin to cure wherein said composite wrapping is bonded to said wood support piling with a mechanical bond;

wherein the bundle of fibers comprises twelve tow strands;

wherein said wood piling is at least 10 feet long;

wherein said composite wrapping covers a portion of said wood support piling adapted to reside two feet below ground surface and four feet above ground surface when the wood support piling is installed in the ground;

wherein the curing of said composite wrapping causes said composite wrapping to shrink to thereby radially compress said wood support piling;

wherein said reinforced support piling has a second stiffness, said second stiffness being at least 35 percent greater than a first stiffness of said wood support piling without said composite wrapping;

wherein said composite wrapping forms a layer of substantially uniform thickness; and

wherein said composite wrapping is a single, seamless layer.

65. (Currently Amended) The method 61 wherein the ~~plurality of strands~~multiple tow bundle of fibers comprises windings that form an angle within a range of 60-90 degrees with respect to a longitudinal axis of said wood pole.

66. (Currently Amended) The method of claim 65, wherein the angle formed by the windings of the ~~plurality of strands~~multiple tow bundle of fibers is approximately 80 degrees.